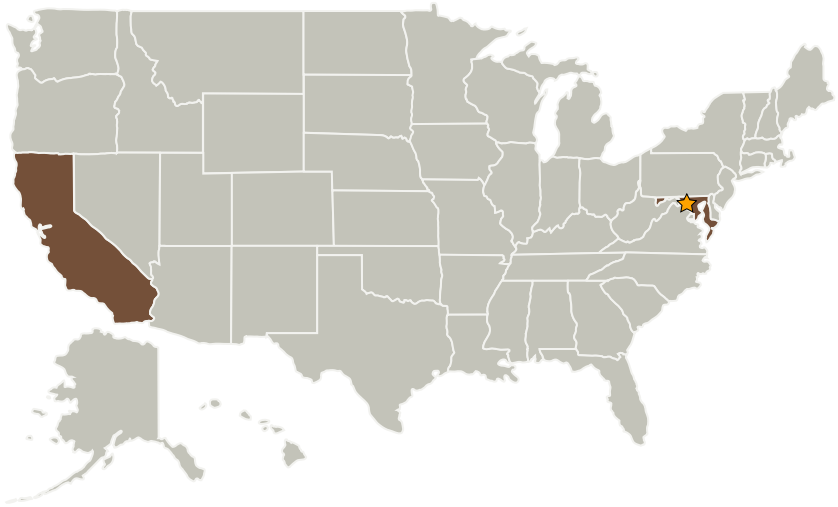
Switching Fabric based on Multi-Level LVDS Compatible Interconnect, Phase I

Completed Technology Project (2004 - 2004)

Project Introduction

The switching fabric (SF) is a key component of the next generation back plane interconnects. Extremely low-power, radiation-hardened, high-bandwidth upgradeable communication between computer nodes is of utmost importance for future NASA missions. The state-of-the-art binary SF interconnect architectures have high power consumption and low latency in order to perform internal data conversion and synchronization that allow for recognition of redundant bits and extraction of useful information from the data stream. The high power consumption of SF limits its application in the next generation nano-satellites. In order to minimize latency and reduce power consumption, we propose a novel, easy-to-align SF based on multi-level power-efficient Low Voltage Differential Signal interface. Our approach uses differential 3-level signals to mark a high-level reference bit position in one of the differential channels. Because the marked pilots follow the high-level logic in one of the differential outputs, they will regularly occur at the same bit position and ensure stable and easy recovery of the low-speed clock signal, which will be used as a reference for multi-channel data alignment and will synchronize a high speed clocking circuitry using a standard clock multiplier technique.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Goddard Space Flight Center (GSFC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Goddard Space Flight Center(GSFC)	Lead Organization	NASA Center	Greenbelt, Maryland
Advanced Science and Novel Technology	Supporting Organization	Industry	Rancho Palos Verdes, California

Primary U.S. Work Locations	
California	Maryland

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Vladimir Katsman

Technology Areas

Primary:

- TX02 Flight Computing and Avionics
  - TX02.2 Avionics Systems and Subsystems
    - TX02.2.6 Data Acquisition Systems